APPENDIX H

REGION 5 GUIDE FOR DEVELOPING ENVIRONMENTAL GOALS, MILESTONES, AND INDICATORS

CONTENTS

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H.1 OVERVIEW

In the era of increased public and political scrutiny on government agencies, it is imperative for EPA Region 5 to focus its limited resources on achieving environmental results for the most important environmental problems facing public health and the environment. By developing an appropriate mix of environmental indicators and performance measures, the Region will be better positioned to evaluate environmental conditions, identify existing and emerging environmental problems, set environmental priorities, and make program-specific decisions to address the highest priorities. Environmental indicators will also allow for more effective means of communicating environmental successes and remaining challenges to the public and other stakeholders.

The purpose of this document is to provide the Region 5 Teams and Program Managers with some guidance for developing Regional environmental goals, milestones, and indicators. This document was developed by the Region 5 Environmental Indicators Workgroup and is based on the "Pressure-State-Response" approach being taken by EPA's National Goals Project, the Interagency Sustainable Development Indicators Workgroup, and the Region 5/State Watershed Indicators Development Workgroup. The Pressure-State-Response approach involves linking environmental indicators to stressors that affect the environment and to program activities. Use of this approach should promote consistency in the development and application of environmental indicators within Region 5 and will result in Regional goals that are consistent with EPA's 12 national goals.

H.2 DEFINITIONS

In order to implement the Pressure-State-Response approach that is recommended in this guidance, it is critical to understand the following terms:

Pressure or stressor: A factor that can adversely affect environmental conditions. Pressures and stressors can be human-induced or nature-induced. Examples of human-induced pressures include toxic pollutants, nutrients, habitat loss, sedimentation, hydrological changes (flow), and exotic species introduction. Examples of some natural pressures include predation, volcanic eruptions, and floods.

State or condition: The actual biological, chemical, or physical quality of the environment, including ecosystem and human health. Some examples of environmental conditions include toxic chemical concentrations in air, water, soil, or blood; species diversity; and number of respiratory illnesses.

Response or program activity: For the purposes of the Pressure-State-Response approach, "response" is not a biological, ecological, or ecosystem response. Rather, "response" refers to the regulatory or voluntary actions taken by government agencies or other parties (for example, industries) to address or remedy an identified stressor/pressure on the environment. The ultimate goal of the response or program activity is to improve the quality of the environment. Some examples of responses include passing legislation, promulgating regulations, installing new treatment technologies, issuing permits, taking enforcement actions, implementing best management practices, and remediating a "hotspot." The administrative response actions taken by environmental agencies are often tracked by performance measures, program measures, or program indicators.

Goal: A broad statement that identifies the overall desired, future environmental condition. Goals are generally long-range targets. If very broad goals are used, they are often broken down into

subgoals or objectives that have specific desired end points. EPA has developed 12 national goals that will provide a very useful framework for developing Regional goals. An example national goal is as follows: "America's rivers, lakes, and coastal waters will support healthy communities of fish, plants, and other aquatic life and will support uses such as fishing, swimming, and drinking water supply for people."

Milestone: A specific interim step that is necessary to meet a stated goal. Milestones are check points that are established to identify "shorter-term" responses in environmental stressors or conditions that will lead toward the overall goal. Usually, a goal will have several milestones that will have to be met to achieve the goal. An example milestone is as follows: by 2005, the average mercury concentrations in fish tissue from lakes with mercury fish consumption advisories will be reduced by 50 percent. In terms of timeframe for milestones, the National Goals Project uses a 10-year duration.

Environmental indicator: A measure of environmental conditions (for example, human health, quality of life, and ecological integrity) or stressors that provides useful information on patterns and trends. Indicators are invaluable for measuring achievement of the milestones and progress towards the environmental goal. Indicators can also function as early warning signals for detecting relatively small adverse changes in environmental quality. Three examples of environmental indicators are as follows: concentration of total and methyl mercury in walleye fillets; concentration of total mercury in ambient waters; and total pounds per year of mercury released to waterways by NPDES facilities. The timeframe for monitoring, assessing, and reporting on an environmental indicator may range from as little as several times per year to once every year or longer. Also, a change in ecological or human health conditions may not be manifested or discernable for several or perhaps many years.

Performance measure or program indicator: A program, policy, or administrative response to an environmental problem. These measures are commonly referred to as "beans" when tracked routinely and represent a large portion of what environmental agencies have tracked and reported in the past. Performance measures may or may not lead to detectable improvements in environmental conditions. Two examples of performance measures are as follows: number of NPDES permits issued with water quality-based permit limits for mercury, and number of enforcement actions taken that involve mercury. In terms of timeframes, performance measures are usually tracked on an annual or more frequent basis.

H.3 PRESSURE-STATE-RESPONSE APPROACH

The "Pressure-State-Response" approach is a way of conveniently classifying and understanding the interaction between the pressures on the environment, the state of the environment due to these pressures, and the response or action taken by environmental agencies or other parties to address the environmental conditions and pressures. The Pressure-State-Response is the organizing framework used in or by the National Goals Project, the State Environmental Goals and Indicators Project, the Interagency Sustainable Development Indicators Workgroup, and the Region 5/State Watershed Indicators Development Workgroup.

One way to display the Pressure-State-Response approach is in a straight continuum that shows the movement from a program activity, to a stressor control, and to the desired outcome or environmental condition (see Figure 1). Regardless of how the Pressure-State-Response approach is displayed, in order to be successful, it is absolutely necessary to select indicators that are measurable and can be monitored and to link the pressures with the environmental conditions.

Otherwise, it will be difficult or impossible to tell whether the changes in environmental trends are due to program activities and agency actions or something else.

H.4 STEPS FOR DEVELOPING ENVIRONMENTAL GOALS, MILESTONES, AND INDICATORS

Listed below are some steps designed to assist in developing environmental goals, milestones and indicators under the Pressure-State-Response approach. The first set of steps involves setting environmental goals and identifying environmental priorities. Nationally, EPA has developed a set of national goals and milestones that provide a very useful framework for the Region. The second set of steps involves identifying the stressors and pressures on the environment that have caused or contributed to the environmental problems. Finally, the third set of steps involves identifying what actions and responses are necessary to address the stressors and pressures and ultimately address the environmental problem and achieve the environmental goals.

The steps listed below are provided as guidance. Each situation will be different when developing goals, milestones, and indicators. Some of these steps may be unnecessary or may be more useful when taken in a different order. The order of the steps is not as important as the content and focusing on the following key concepts: (1) develop a good set of overarching environmental goals that represent the suite of desired future conditions; (2) develop milestones for the goals that are reasonable and that track interim progress towards the desired changes in environmental conditions and pressures; (3) select a mixture of indicators that measure environmental conditions and pressures; and (4) select key program activities and performance measures that are linked to the milestones and indicators.

If assistance is needed in developing goals, milestones, or indicators, the Regional Environmental Indicators Workgroup is available and can be consulted by contacting Linda Holst at (312)886-6758.

H.4.1 DEVELOP ENVIRONMENTAL GOALS, ANALYZE ENVIRONMENTAL CONDITIONS, AND IDENTIFY ENVIRONMENTAL PROBLEMS

Step 1. Form a stakeholders group to assist in developing goals, milestones, and indicators. Appropriate stakeholders may include other federal agencies (for example, U.S. Fish and Wildlife Service and Natural Resources Conservation Service), state environmental and natural resource agencies, environmental groups, the regulated community, public interest groups, and local church or civic groups. Implement the remaining steps with this stakeholder group, as deemed appropriate. In some situations, it may be feasible and effective to have all stakeholders involved throughout the process. In other cases, it may be more appropriate to have stakeholders brought in under a phased approach, where a smaller group of stakeholders develops some initial goals, milestones, and indicators and presents it to a larger group of stakeholders for their reaction and modification. Whatever approach is used, it is critical to have stakeholders involved and to get broad representation and buy-in to the goals, milestones, and indicators that are ultimately developed.

Step 2. Identify the desired future environmental conditions (that is, environmental goals). These goals may take decades or longer to achieve. It is desirable for the goal to be consistent with the national goals. If the goal selected is very broad, it can be divided further into subgoals or objectives, if desired, in order to make it easier to develop milestones and indicators.

Step 3. Examine existing reports, survey information, and data on environmental conditions to determine the state of the environment. Existing information could include comparative risk

studies, public opinion surveys, monitoring reports, and other studies. For each environmental goal, identify environmental problems that need to be addressed and environmental conditions that need to be maintained or protected in order to meet the environmental goal.

Step 4. If necessary, prioritize the environmental problems or conditions in order of importance (for example, risk) and ability to be addressed. In some cases, the prioritization may have already been done. In other cases, the number of environmental problems may be sufficiently few that prioritization is not warranted. If prioritization is necessary, comparative risk techniques are very useful tools for ranking issues. If assistance or information on comparative risk is needed, please contact Carole Braverman in the Office of Strategic Environmental Analysis at (312) 886-2910.

Step 5. For each environmental goal (or subgoal), identify interim targets (such as state milestones) to achieving the desired environmental condition. These milestones should focus on environmental conditions and should have quantifiable targets (for example, 50 percent reduction in a contaminant in surface water) and a specific target date (for example, by the year 2005). The National Goals Project contains more than 60 milestones that may provide a useful starting point.

There is some imprecision in developing milestones because of the difficulty in being able to predict changes in environmental conditions based on future actions. Care should be taken to select milestones that will be challenging to attain but not totally unachievable.

Step 6. For each state milestone, select environmental measures (such as state indicators) that will track progress towards the milestone and goal. The state indicators would correspond to level 4-6 indicators on the continuum. In order to ensure maintenance of a healthy environmental condition, it is critical to have some indicators that will act as an early warning for pending or potential problems before they are actual environmental problems. Selection of indicators should not be solely reactive to existing environmental problems but should also be proactive and preventative, when possible.

For each indicator, identify possible data sources that will provide a sufficient amount of information with sufficient quality to track the indicator. Information may be housed in national, regional, state, or local data systems.

When finalizing the list of indicators, consideration should be given to whether data of sufficient quantity and quality will be available in the future to be able to monitor trends. If it is determined that the indicator is valuable but sufficient information is not available, this indicator should be "flagged" for further discussion by the stakeholder group to determine if appropriate data can or should be collected in the future.

H.4.2 IDENTIFY CAUSES OF ENVIRONMENTAL PROBLEMS OR ISSUES

Step 1. For each environmental problem or issue, identify the stressors or pressures that cause or contribute to it. Classify the stressors or pressures as "known or strongly suspected" or "possible."

Step 2. For the stressors or pressures classified as "possible," identify what additional data or information are necessary to link the cause to the environmental problem or issue. Flag these as items that need to be investigated further.

Step 3. For each "known or strongly suspected" stressor and pressure, identify interim targets (such as pressure milestones) that will achieve the environmental goal by addressing the pressure

or stressor. Again, the milestones should have quantifiable targets (for example, 20 percent reduction in discharges of mercury) and a specific target date (for example, by the year 2005).

Step 4. For each pressure milestone, select environmental measures (such as pressure indicators) that will track progress towards the milestone and goal. Pressure indicators would correspond to level 3 indicators on the continuum.

H.4.3 ACTIONS TO ADDRESS ENVIRONMENTAL PROBLEMS OR ISSUES

Step 1. For each state and pressure milestone, identify possible programs that can affect the environmental conditions or address some of the environmental pressures.

Step 2. For each program, develop a list of activities or actions that the program conducts or could conduct to affect the environmental condition, or address the state and pressure milestones.

Step 3. For each activity, identify performance measures that will track progress of the activity. It is critical for the state and pressure indicators and performance measures to be linked to each other and to the milestone. The objective is to select performance measures and indicators that are meaningful and not duplicative. In addition, where performance measures or program activities have been shown to be correlated with an environmental indicator, it may be appropriate to track only one of them.

For each performance measure, identify possible data sources that will provide a sufficient amount of information with sufficient quality to track the measure. Again, information may be housed in national, regional, state or local data systems.

Step 4. Monitor the indicators and performance measures and determine their utility in measuring progress towards the goal and milestones. Report results back to the public and solicit feedback.

Step 5. Make necessary adjustments to the environmental goals, milestones, indicators, and performance measures, based on their usefulness, data availability, and public input.

H.5 EXAMPLES OF GOALS, MILESTONES, AND INDICATORS FOR THE GREAT LAKES

Listed below are some draft goals, milestones, and indicators for the Great Lakes that are being developed by the Region 5 Great Lakes Teams. These will likely be revised but are provided here for illustrative purposes.

Goal: Human Health in the Great Lakes Ecosystem is not at risk from contaminants of human origin.

Objective 1: Concentration of toxic chemicals in fish and wildlife are below levels that limit consumption by humans.

Milestones:

1. By 2015, concentration of contaminants in fish fillets have decreased by X percent (per contaminant).

2. By 2005, concentration of contaminants in water has decreased by X percent.

3. By 2005, loadings of key parameters have decreased by X percent.

4. By 2005, effluent emissions of key parameters (such as mercury, PCBs, dioxin, aldrin, and toxaphene) have decreased by X percent.

5. By 2002, reduce chlorine use in pulp/paper process by X percent or annually chlorine use is reduced by X percent.

6. By 2002, 80% of Great Lakes Basin counties have participated in clean sweeps activities.

7. By 2005, remedial activities have been completed at X percent of contaminated sediment sites. Remediation activity completed means sediments are removed or managed in place.

8. Annually X percent of PCBs are removed from use in the Great Lakes Basin.

9. By 200X, pollution prevention and other emission controls result in decreases of X percent of PCB, dioxin, and mercury releases.

10. By 200X, emission controls and pollution prevention activities result in a decrease or, at a minimum, no increase, in pounds of mercury and dioxin released per user population.

Indicators:

1. Concentration of contaminants (such as PCBs, toxaphene, aldrin, and DDT) in fish fillet of coho and chinook salmon (for Lakes Superior and Michigan) and walleye (for Lake Erie).

2. Concentration of contaminants in water.

3. Contaminant loadings of key parameters. Although this is a good indicator, current available data may not be sufficient for total load estimates, except under Lake Michigan Mass Balance.

4. Effluent and emissions of key parameters. Sources of effluent and emissions data include Toxic Release Inventory (all media), Permit Compliance System (water), and Regional Air Pollutant Inventory Development System (air).

5. Chlorine use in pulp/paper industry (tons).

6a. Number of counties participating in Clean Sweeps.

6b. Volume of materials recovered.

7a. Volume of sediment removed or managed.

7b. Number of complete remedial activities.

8. Amount and percentage of PCBs removed from use. Indicators need to be refined through interaction with programs.

9. Emissions of PCBs, dioxins, and mercury (in pounds) released from hazardous waste incinerators, municipal incinerators, and medical waste incinerators.

10a. Emissions of mercury and dioxin from electric generating boilers (in pounds).

10b. Pounds of mercury and dioxin released per user population.